

THE FLOODS OF MARCH, 1928, IN THE SACRAMENTO VALLEY

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The first intimation of high water in the sections involved were the general and fairly heavy rains of March 23, which were coextensive with those in the mountain and foothill sections of the Sierra Nevada and in the Sacramento Canyon from Redding to Sisson, and thence northward to the southern slope of the Siskiyou. At no time during the high waters was there any snow on the flanks of the mountains, and that on the ground was confined to the extreme altitudes, where there was much less than usually has accumulated at this season of the year. For these reasons there was but little apprehension of danger.

On the morning of March 24 the rains were still in progress, with heavy amounts throughout the mountains, the Sacramento Canyon, and the upper regions of the Mokelumne-Cosumnes Rivers, and it seemed evident that they would continue for an indefinite period and probably would result in moderately high stages in many of the rivers in the drainage basin of the Sacramento River.

At this time there were unusually large numbers of cattle and sheep ranging much farther away from the river than is usual at this particular season of the year. Warnings were sent to all interested that the lowlands adjacent to the Sacramento River probably would overflow during the next day or two, and of all the advices distributed during the prevalence of the high waters none was more valuable nor timely, as, with one exception, they were immediately heeded.

Later during the day of March 24 special messages received indicated exceptionally heavy rains throughout the American River watershed, especially in the high regions drained by the forks of this stream, which were rapidly rising.

Acting on this information the California State Highway Commission was notified that the subways leading out of Sacramento to the north would be in danger of overflow. The city officials of Sacramento also were informed of the prevalence of the heavy rains in the American River drainage basin.

By the morning of the 25th the American River at Folsom had reached a stage in excess of 22 feet and was rising rapidly with all forks of this stream running at high stages. Rapidly rising rivers also were reported from the upper reaches of the Feather-Yuba and from the high stretches of Alpine County which drain into the Mokelumne and Cosumnes Rivers, making it advisable to issue warnings to Bensons Ferry, Lodi, and New Hope Landing in the lower reaches of the two streams referred to.

Early during the morning of the 25th the subways were rapidly becoming covered with water and warnings were immediately sent to North Sacramento, a settlement across the American from Sacramento City, that all but the high sections in that settlement would be flooded by or before night. Later during this day the warnings were made urgent, and many whose homes were in the lower spots began moving their furniture to places of safety. At 1 p. m. of the 25th, the unprecedentedly high stage of 40 feet was reported from the suspension bridge at the junction of the middle and north forks of the American River near the town of East Auburn, and at about 4 p. m. of this date the American River at Folsom crested at 26.8 feet equaling the high water at that point

of March, 1907, and exceeding by over 2 feet that of the floods of 1909.

By noon of the 25th the back water from Sacramento began spreading over some of the lowland in North Sacramento and by night that settlement was practically isolated, and the water was overflowing from the American into the hop lands and vineyards in the vicinity of Mills Station. About this time the H Street Bridge was completely surrounded by water and there was no outlet by land on the north side of Sacramento.

At about 1 p. m. of the 25th 20 gates of the Sacramento by-pass were opened and that night the remaining gates, except one which became jammed, were opened, and the next morning the refractory gate was dynamited, making 48 gates in all through which the water was flowing into Yolo Basin. As soon as the first group of gates was opened, warnings were given the Courtland operator for distribution to all patrons in the basin, and another warning was sent when the remaining gates were opened, with the additional information to the effect that Fremont Weir, which opens into Yolo Basin near the mouth of the Feather River, soon would be discharging and that Putah Creek would add considerable water to that already flowing down the trough of this sink.

Late during the night of the 25th the situation in North Sacramento was becoming serious, and in many cases the water had reached the first floors of houses, from which families were being rescued by rowboats, launches, and rafts.

All during the night of the 25th there was a panic in the rather populous settlement across the river, and there were many pitiful calls to the Weather Bureau from houses where the telephone lines continued intact, and from persons in the city of Sacramento itself, who had interests in the suburban town. Women with babies in arms, old people and invalids, some practically helpless, all were frantic as they viewed the swirling waters hurrying past their houses with no assurance that foundations would hold. Of course, everything was being done that could be done, and the work of rescue proceeded with surprising speed when the general conditions were considered. One old man was swept away by the current and drowned while trying to get his family out and a large number of people had narrow escapes. A number of Japanese were marooned in a particularly low spot, and their cries, in almost unintelligible English, added pathos to the already touching situation. "Would the honorable weather man please stop the waters from covering us up," was caught among the plaintive jargon that drifted tearfully in over the phone, and, "For God's sake, open the floodgates and let the water drain away," came in oft-repeated refrain.

At 3 a. m. of the 26th the river at Sacramento crested at 29.5 feet, which is just 0.1 foot below the highest stage ever recorded since the great floods of 1862. On this date the American at Folsom had fallen considerably from its crest stage of the preceding date, but the Feather-Yuba and Bear Rivers were moderately high and rising with heavy rains still in progress, especially in the north fork of the Yuba, in the vicinity of Colgate, where torrential rains were reported. At this point the river already had crested at 7 a. m. of the 25th at the high stage of 20 feet, but it again rose rapidly after the observation of the 26th and by 10 p. m. of this date a stage of

21 feet was reached. During the passage of this last flood wave the river gauge, which was anchored to a rock in midstream was washed away, and it is thought that the rock itself was moved. Through the courtesy of the Pacific Gas & Electric Co., numerous reports were telephoned, making it possible to keep closely in touch with the passage of the up-Yuba high water.

On the 26th general flood warnings of dangerously high water with occasional flood stages were broadcast by every available method to all sections on the Sacramento River and its tributaries, except the American and Pit Rivers. Flood warnings already had been sent to the lower Mokelumne and Cosumnes Rivers which at this time were rapidly rising. On this date there was no improvement in the town of North Sacramento, where all low parts were flooded, notwithstanding the fact that immense amounts of water were flowing through Fremont Weir and the Sacramento by-pass. To all inquirers from the Feather-Yuba sections where the waters still were rising, it was stated that the crest of the upper regions of these streams would not reach the lower Feather River before the 27th, and it was advised that all levees be closely watched for leaks and gopher holes.

On the morning of March 26th all the lowlands in North Sacramento were flooded and every outlet leading out of the city of Sacramento to the north was blocked by water. The highest water in the afflicted town was reached at about 2 a. m. of this date, after which it began very slowly to recede. Assurances were given that the worst was about over, although the work of rescue was still going on and the warnings given the city during the previous day to patrol all levees were repeated. It was stated that although the crest of the American River flood was passing downstream, there was still sufficient water in the Feather and the intermediate reaches of the Sacramento to keep the river between Knights Landing and the mouth of the American at a high stage for several days.

On the 26th the waters of Fremont Weir, those of the Sacramento by-pass, and the discharge of Putah Creek had accumulated in the lower portion of Yolo Basin, and by night of this date Liberty and Prospect Islands, the upper portion of the Hasting tract, and a number of smaller holdings were under water. All these lands were planted to sugar beets, asparagus, and grain, causing the heaviest losses sustained in any of the flooded areas of the Sacramento Valley. The levees which protected "Permanent" Liberty held, as did those of the Egbert tract, but there was considerable seepage from all levees which skirted Cache Slough from which no small damage resulted. Other than that mentioned there was no further damage in the basin, and there was none at all in the lower reaches of the Sacramento, notwithstanding the fact that the waters remained dangerously high from Courtland to Isleton for several days.

In the meanwhile, on March 26th, heavy rains still were falling in the extreme upper watershed of the Sacramento River from Kennett as far up as Sisson, which seemed to justify supplementary advices to the observer at Red Bluff to warn all interests that the flood stage would be reached at that point during the night.

Early during the morning of the 27th the river at Kennett crested at 23 feet, and at 10 a. m. of this date a stage of 26.9 feet was reached at Red Bluff, but shortly after this hour a general fall was in progress from Tehama to the extreme upper reaches of the river. However, at this time the heavy rains which occurred in the forks of the Feather during the preceding date were being reflected in the river in the vicinity of Oroville, which

was rapidly rising, reaching its crest, 27 feet, just before midnight of the 26th. The Yuba River at Marysville already had responded to the flood wave of its upper forks, reaching a stage at that point of 24 feet at 5 a. m. of the 27th, or 0.1 foot above the previous high-water record of January 16, 1909.

During the 27th the lower Feather was dangerously high as this reach of the river began to respond to the upper flood wave of that stream before that of the Yuba had passed, although there was some relief afforded by the breaking of levees in the vicinity of Alicia, causing the flooding of quite an extensive area planted to onions and sugar beets, the water spreading to and covering the town of Arboga. Other slight relief resulted in the escape of the excess waters at Hamilton Bend, which flowed westward north of Marysville Buttes between Gridley and Biggs and thence down Butte Slough to Butte Basin, where they were taken care of. A like condition occurred during the floods of 1907 and 1909, but during the last named flood the waters flowing over Hamilton Bend found their way to the town of Meridian, causing a break in the levees, which protected district 108 at Moon's Bend and flooded a large area in Colusa Basin.

The Feather River at Nicolaus, near the junction of the Feather and Bear Rivers, about 7 a. m., March 28, reached a crest of 23.2 feet, 0.2 foot above the previous high-water mark of January 1, 1914, and the same amount above the crest forecast for that place. During the night of the 27th the levees that protected the lands below this town began sloughing, a condition which continued during the 28th, necessitating the employment of about 100 men to keep them in repair.

Some of the warnings distributed by telephone during the 27th stated that the upper Sacramento flood-wave was hurrying downstream, and advised that all levees between Stony Creek and the mouth of the Feather should be closely watched during the next 24 hours. Inquiries from the manager of the Monroeville Orchard Co. were answered with the information that the probability was that some of the lands in the vicinity of Hamilton City would overflow before the passage of the high water. The wave reached Hamilton City during the night of the 28th, when the current was so strong as to tear from its support the river gauge on Gianella Bridge without leaving a vestige behind.

The Mokelumne at Bensons Ferry reached flood stage early during the morning of the 27th and at about 2.30 p. m. of this date crested at 13.8 feet, 1.8 feet above flood stage, causing the flooding of a large area of land in the vicinity of Lodi and New Hope Landing.

On the 28th the Sacramento in its reaches adjacent to the American still maintained high stages, but the tendency was to slowly fall. It still was high from Walnut Grove to the mouth of Cache Slough, which was discharging heavily, and it was estimated that the combined flood waves of the American and Feather Rivers were somewhere between those two points.

At 7 a. m. a stage of 19.2 feet was reported from Knights Landing, and although the crest of the up-river wave was still above Colusa, the river at Knights remained stationary at the stage quoted until the evening of the 30th, when it began to fall slowly. This was an unusual condition for the place in question, as crest stages at Knights Landing have always followed those of Colusa from 12 to 16 hours later. The cause, no doubt, was due to the flattening of the wave as it proceeded downstream below Colusa, and also because of the dis-

charge of Fremont Weir, which was handling much of the water which came out of the Feather and permitted of a more rapid run-off of the Sacramento below Knights Landing. In any event a stage of 20 feet was forecast for the place in question which, even at this time, seems quite a logical prediction when the conditions that occurred above are considered.

On the morning of the 29th the river at Colusa was still rising slowly, cresting at 25.7 feet at about 2.30 p. m., or just 0.3 foot above the stage forecast. On this date the water had receded from the town of North Sacramento, where a condition of tragic destruction was disclosed. The first floors of a large number of houses were covered with muck and in many cases the foundations of the houses themselves were undermined. Innumerable pieces of furniture either were totally destroyed or else damaged beyond repair. According to a conservative estimate made by the officials of the Red Cross Society, who nobly responded to the calls of the needy, the total damage to the afflicted town exceeded \$100,000.

On the 29th all streams had fallen to safe stages, except that the Sacramento below Walnut Grove was still high, but the widening of the river in its lower reaches permitted of a rapid run-off and prevented any overflow below the mouth of Cache Slough. Considerable water was still flowing through Fremont Weir into Yolo Basin, the lower portions of which continued under water.

During the 29th the city officials of Sacramento and representatives of the United States Corps of Army engineers began closing the gates of the Sacramento by-pass in order that the scouring effects of the high water below the mouth of the American might be secured.

On the morning of the 30th the floods were practically over, although the Sacramento from the mouth of the American to Cache Slough was still maintaining moderately high stages, and the lower portion of Yolo Basin remained under water, a condition which prevailed until several days later. The city of Sacramento still was below the level of the river, but all levees which protected the city were holding, as they did throughout the high water, and at no time was the city in imminent danger of overflow.

The floods of March, 1928, in the Sacramento River and in some of the Feather-Yuba sections, did not equal those in the Sacramento drainage basin of March, 1907, and January, 1909, and those in the Mokelumne-Cosumnes were far less serious than the San Joaquin Valley floods of 1911. Compared with the floods named the damage wrought was at least one-third less, but the American, both in its main course and that of its forks, rose higher than in any flood since the high water of 1862, the damage from which was reflected in the heavy losses in North Sacramento and some local damage to the lands adjacent to the river in the vicinity of Mills Station, as well as to the Fair Oaks Bridge, which was damaged. There was, however, much excitement, especially in the vicinity of Sacramento, owing to irresponsible statements that there would be a repetition of the great floods of 1862.

The floods in question would have been far more destructive had there been as much snow in the intermediate altitudes of the mountains as had accumulated during the floods of 1907 and 1909, but, as already stated, the snow pack was confined to the extreme altitudes, where it was much below the normal, and although some rain fell during the period of high water as far up as the summit of the Sierras, there was practically no run-off from snow water at any time during the floods. In fact, it was the first destructive flood which was ever known

to occur in the central valleys of California to which snow water did not largely contribute its quota.

While an unusual effort was made to secure the tabulated data of losses, etc., included herein, it is realized that many of the items treated are incomplete. However, they are as nearly correct as it is possible to make them.

FLOODS OF MARCH, 1928

Estimated money value of losses sustained during the floods:

Buildings and furniture ¹	\$107, 000
Crops ²	220, 000
County roads (erosion).....	5, 000
County bridges.....	65, 000
Damage to lands (washouts).....	20, 000
Levees carried away.....	127, 000
Railroads.....	110, 000
Stock.....	2, 500
Due to suspension of business.....	35, 000
Labor and dredges keeping levees from breaking.....	20, 000
Miscellaneous losses.....	25, 000

Total..... 736, 500

Value of property estimated saved by reason of warnings:

Stock.....	\$25, 000
Levees.....	90, 000
Farming implements, furniture, etc.....	75, 000
Miscellaneous.....	10, 000

200, 000

There no doubt were some lives saved in Yolo Basin, as it is understood that there were some narrow escapes in getting out of the way of the water, which flowed into this sink from the combined output of Putah Creek, Fremont Weir, and the Sacramento By-pass.

HIGH WATER OF MARCH, 1928

The following table gives the precipitation for the month of March, 1928, at river stations, also the highest river stages and dates, and departures from flood stages.

Stations	River	Monthly precipitation	Highest stage	Date	Departure from flood stage
Bensons Ferry.....	Mokelumne.....	3.66	13.8	28th	+1.8
Colgate.....	Yuba.....	13.87	23.4	27th	+0.4
Colusa.....	Sacramento.....	3.34	25.7	29th	-3.1
Folsom.....	American.....	5.97	24.8	26th
Electra.....	Mokelumne.....	10.20	11.5	28th	-0.5
Hamilton.....	Sacramento.....	3.43	22.0	28th	0.0
Kennett.....	do.....	10.65	23.0	27th	-2.0
LaGrange.....	Tuolumne.....	3.61	8.0	26th	0.0
Marysville.....	Feather.....	4.36	24.0	27th	-4.0
Nicolaus.....	do.....	4.34	23.2	28th	-1.8
Oroville.....	do.....	6.65	27.0	27th	+2.0
Red Bluff.....	Sacramento.....	3.78	26.9	27th	+3.9
Sacramento.....	do.....	3.39	29.5	26th	-0.5
Knights Landing.....	do.....	3.37	19.2	28th to 30th	+1.2
Lathrop.....	San Joaquin.....	2.32	16.4	29th	-0.6

RAINFALL FROM MARCH 23 TO 27, INCLUSIVE (INCHES)

Auburn.....	8.30	Grass Valley.....	13.48
Bensons Ferry.....	2.70	Inskip.....	14.78
Blue Canyon.....	14.00	Knights Landing.....	2.71
Bowmans Dam.....	17.18	Kennett.....	5.91
Camptonville.....	14.49	LaGrange.....	2.56
Chester.....	5.92	Lake Spaulding.....	18.14
Colfax.....	10.40	Lathrop.....	2.00
Colgate.....	10.12	Los Plumas.....	9.76
Colusa.....	2.64	Nicolaus.....	3.28
Deer Creek.....	19.14	North Bloomfield.....	12.28
De Sabla.....	11.65	Norden.....	10.46
Dobbins.....	8.73	Quincy.....	9.05
Downieville.....	14.61	Red Bluff.....	2.99
Electra.....	8.17	Sacramento.....	1.89
Folsom.....	4.47	West Branch.....	15.90
Fordyce Dam.....	18.30		

¹ Either totally destroyed furniture or cost of repair.

² Includes those lost and prospective crops.